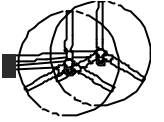
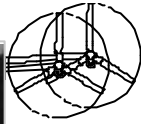


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- Bell Helicopter Textron
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# ***VTOL Heavy Cargo TiltRotor***

Introducing:

***Quad TiltRotor***

**NDIA**

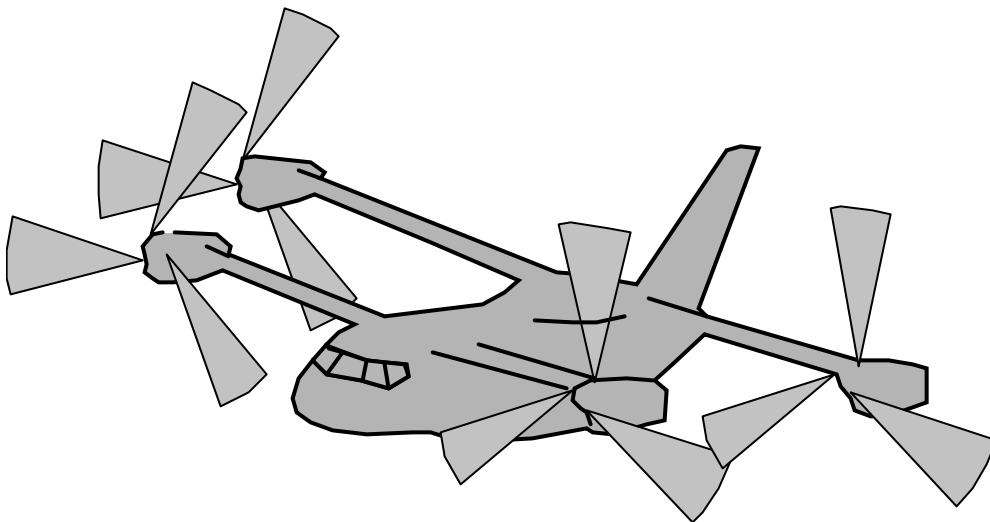
**5th Annual**

**2000 Expeditionary  
Warfare Conference**

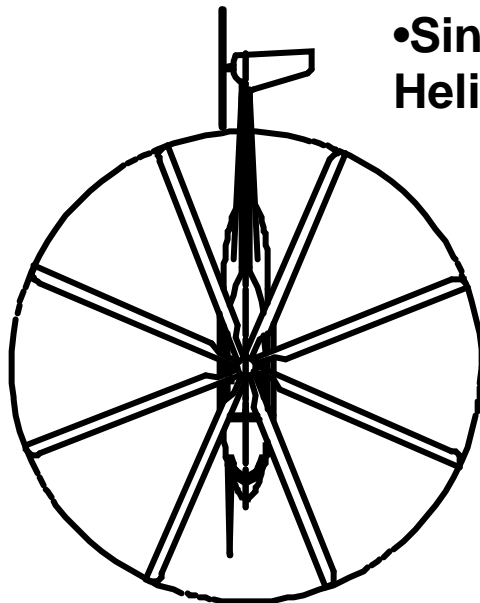
Dick Spivey

Bell Helicopter Textron

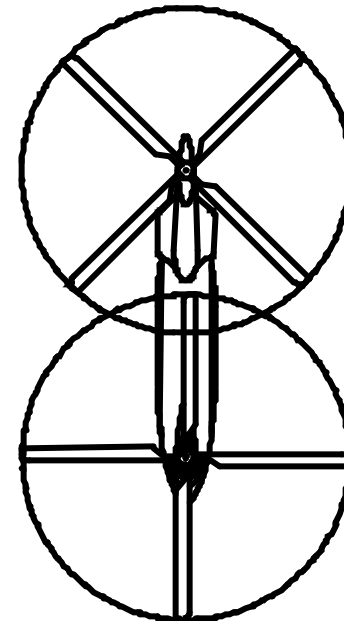
26 October, 2000



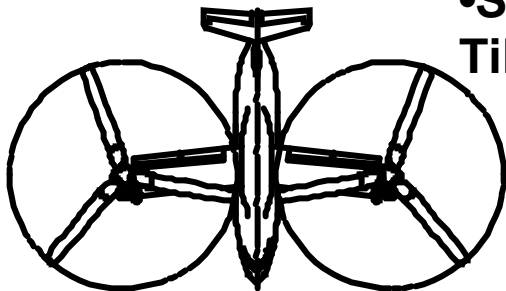
# Candidate Configurations



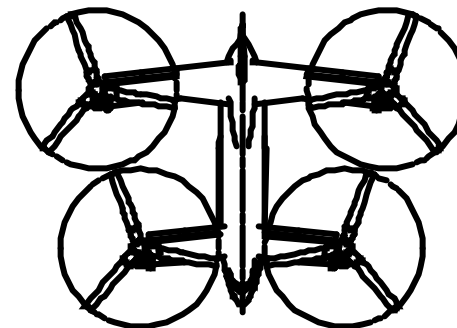
•Single Rotor  
Helicopter



•Tandem Rotor  
Helicopter



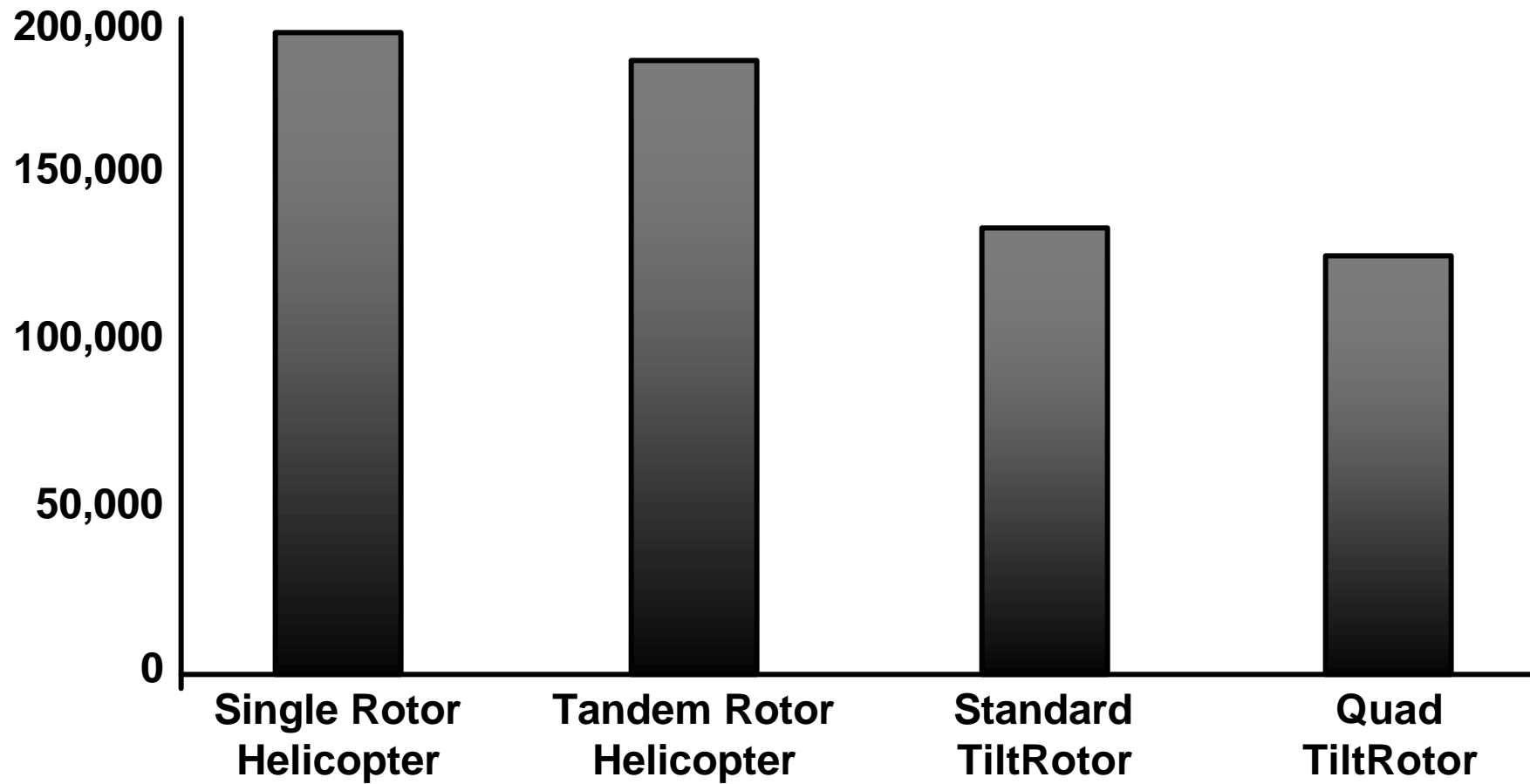
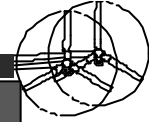
•Standard  
TiltRotor



•Quad  
TiltRotor

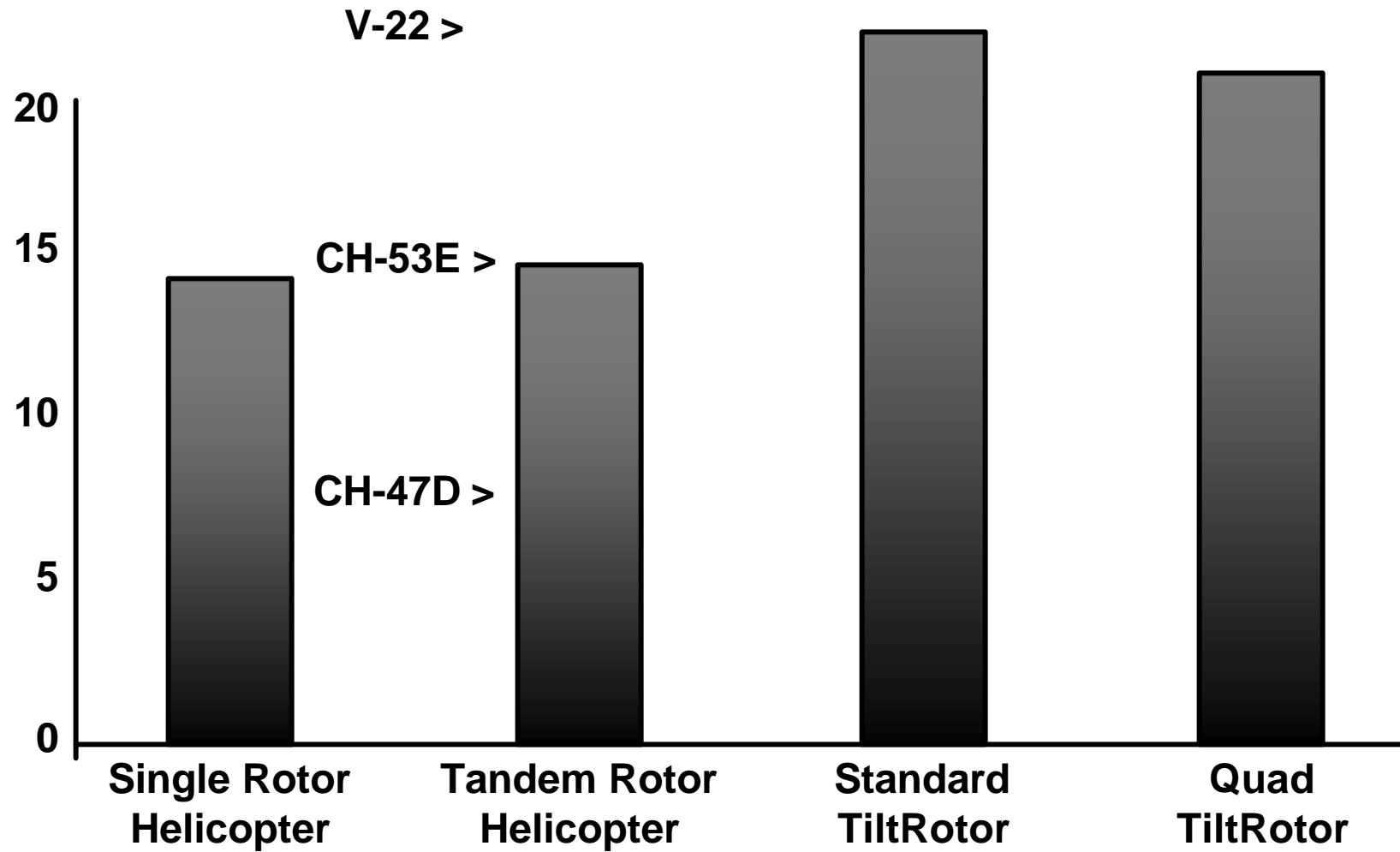
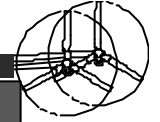
Actual Size Comparisons

# Gross Weight Comparison

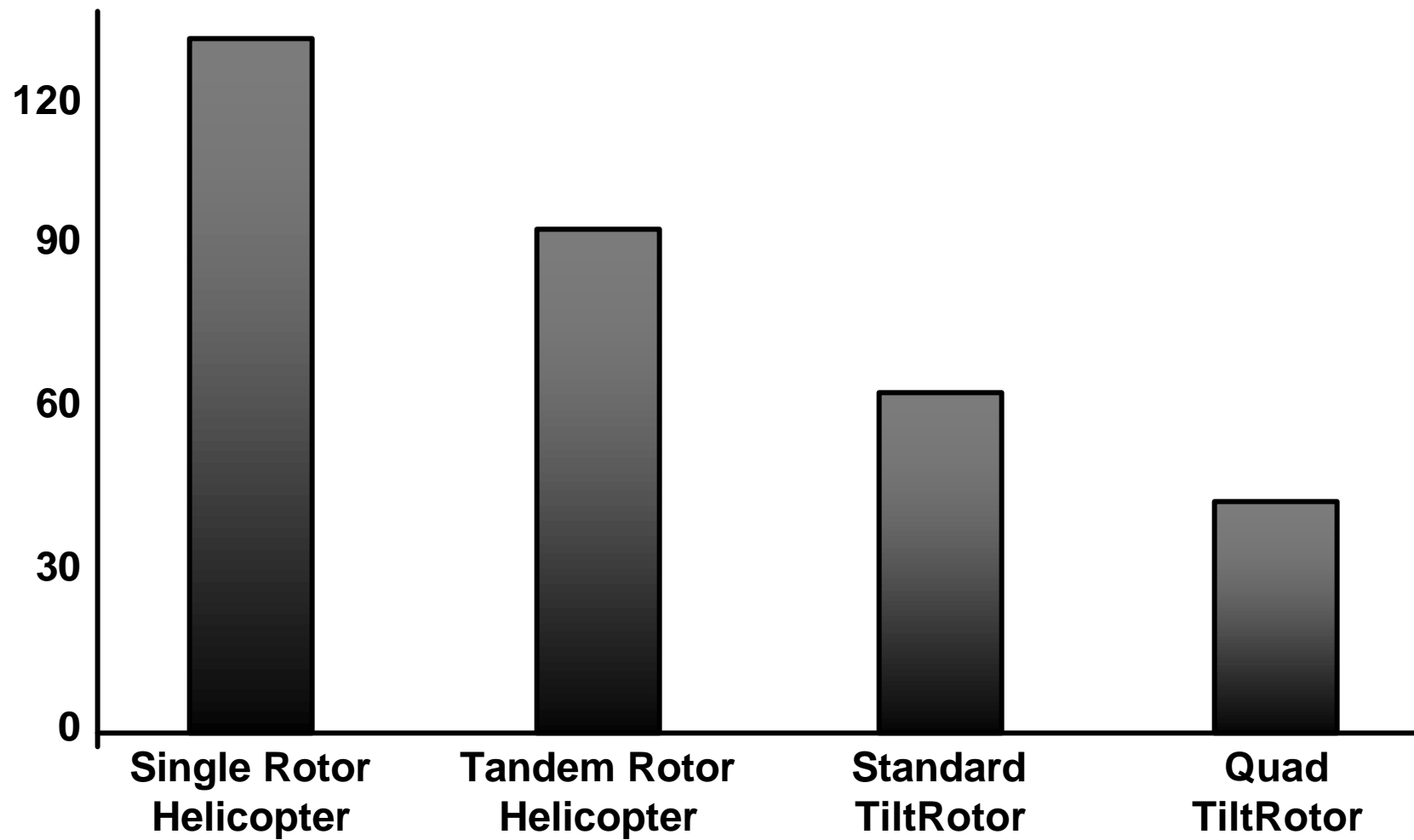
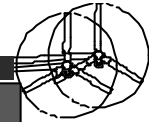


• Bell Helicopter Textron • • •

# Disk Loading Comparison

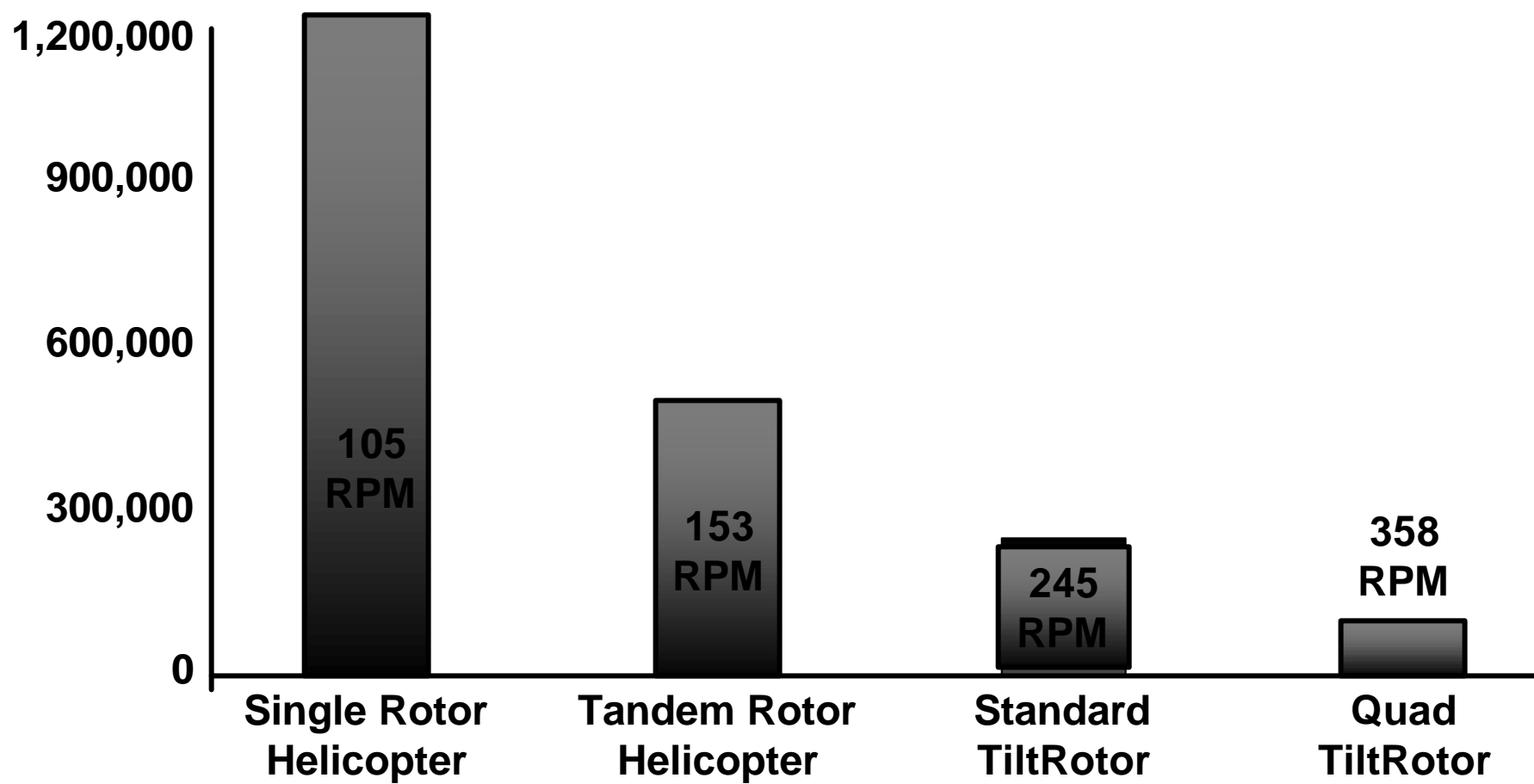
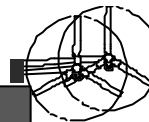


## *Rotor Diameter Comparison*



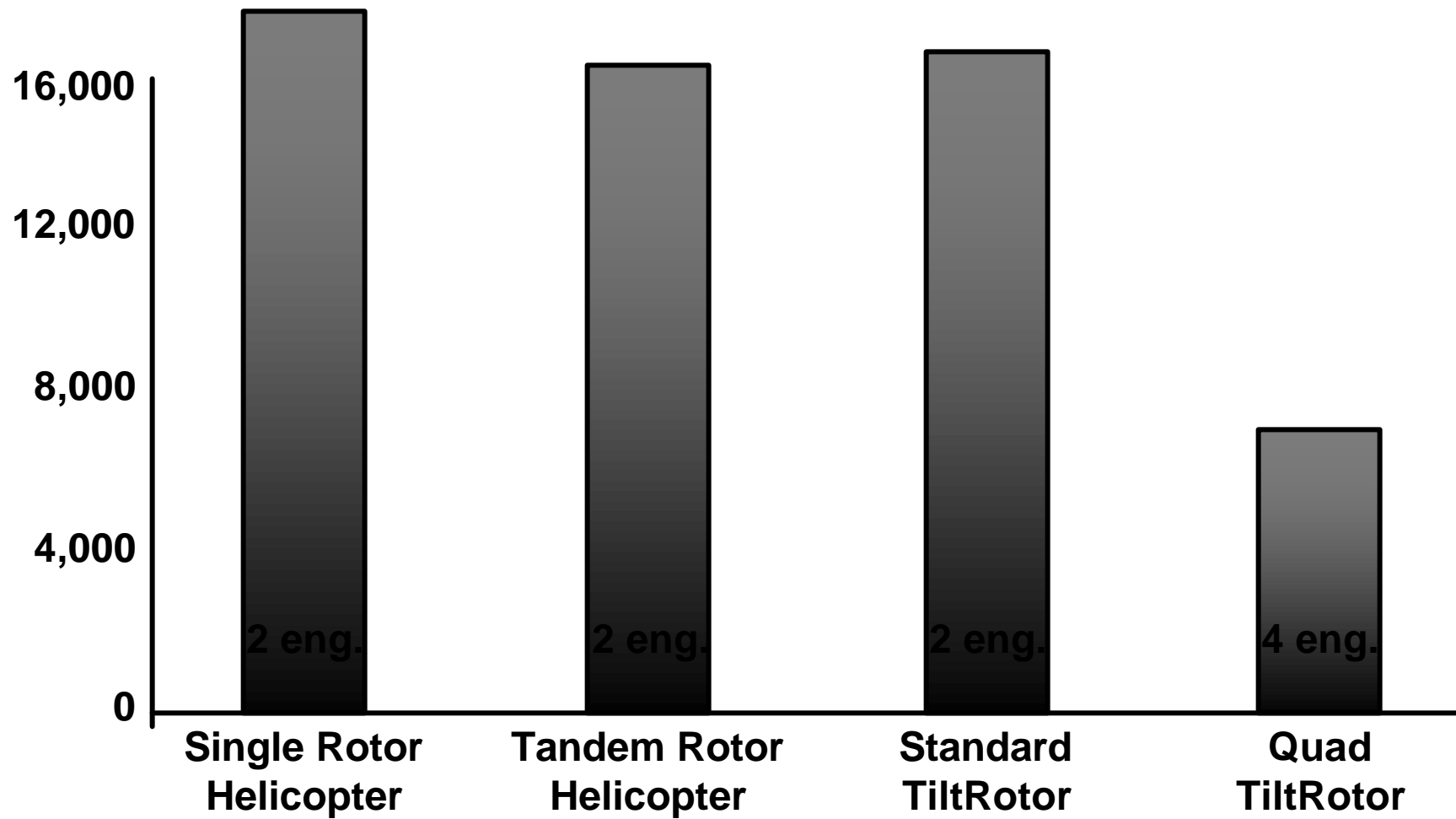
• Bell Helicopter Textron • • •

# Transmission Torque Comparison



• Bell Helicopter Textron • • •

## *SHP/Engine Comparison*

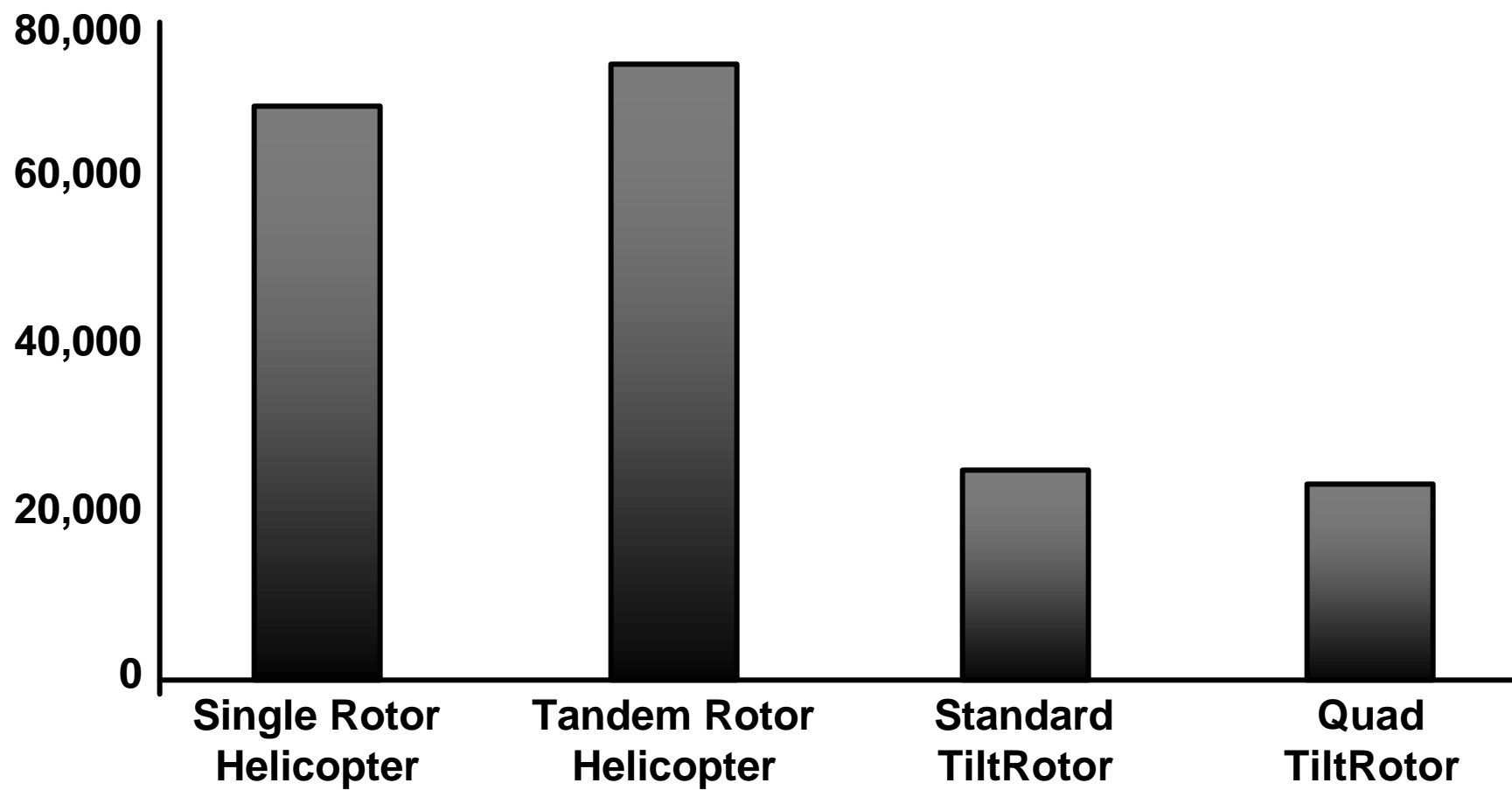


• Bell Helicopter Textron • • •

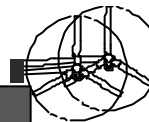


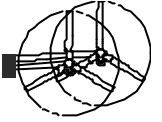


## *Mission Fuel Comparison*



• Bell Helicopter Textron • • •





# *Trade Study Results*

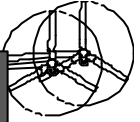
**The QTR appears more effective in meeting the Military missions:**

- **40-50% less mission time**
- **50-65% less fuel required**
- **50-65% less engine power**
- **10-30% less takeoff weight**
- **40-70% less rotor diameter**
- **75-85% less transmission torque**



**And it can self-deploy anywhere in the world in 36 hours along standard air routes with 15,000 pounds of payload**

# *Trade Study Results*



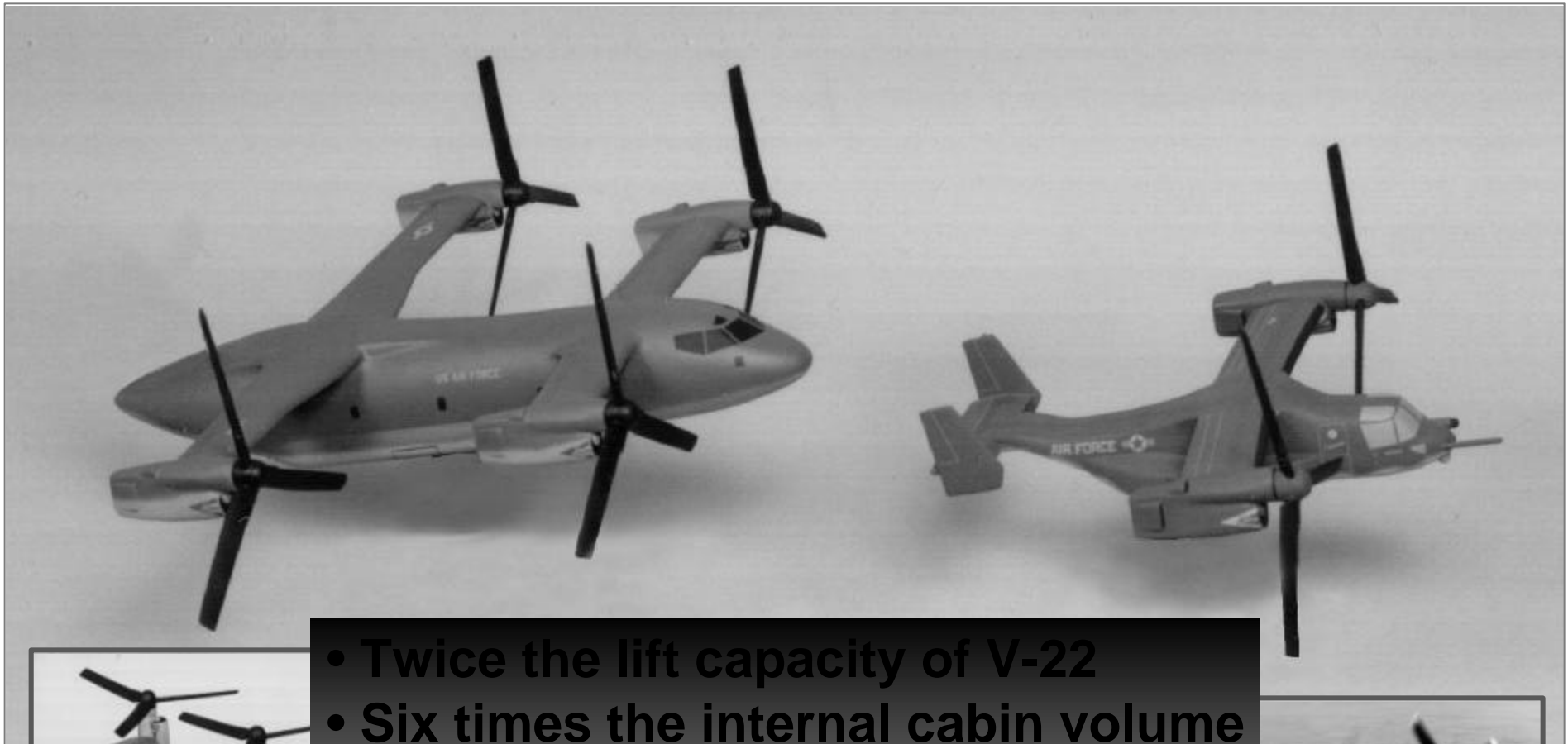
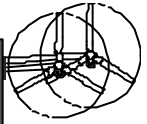
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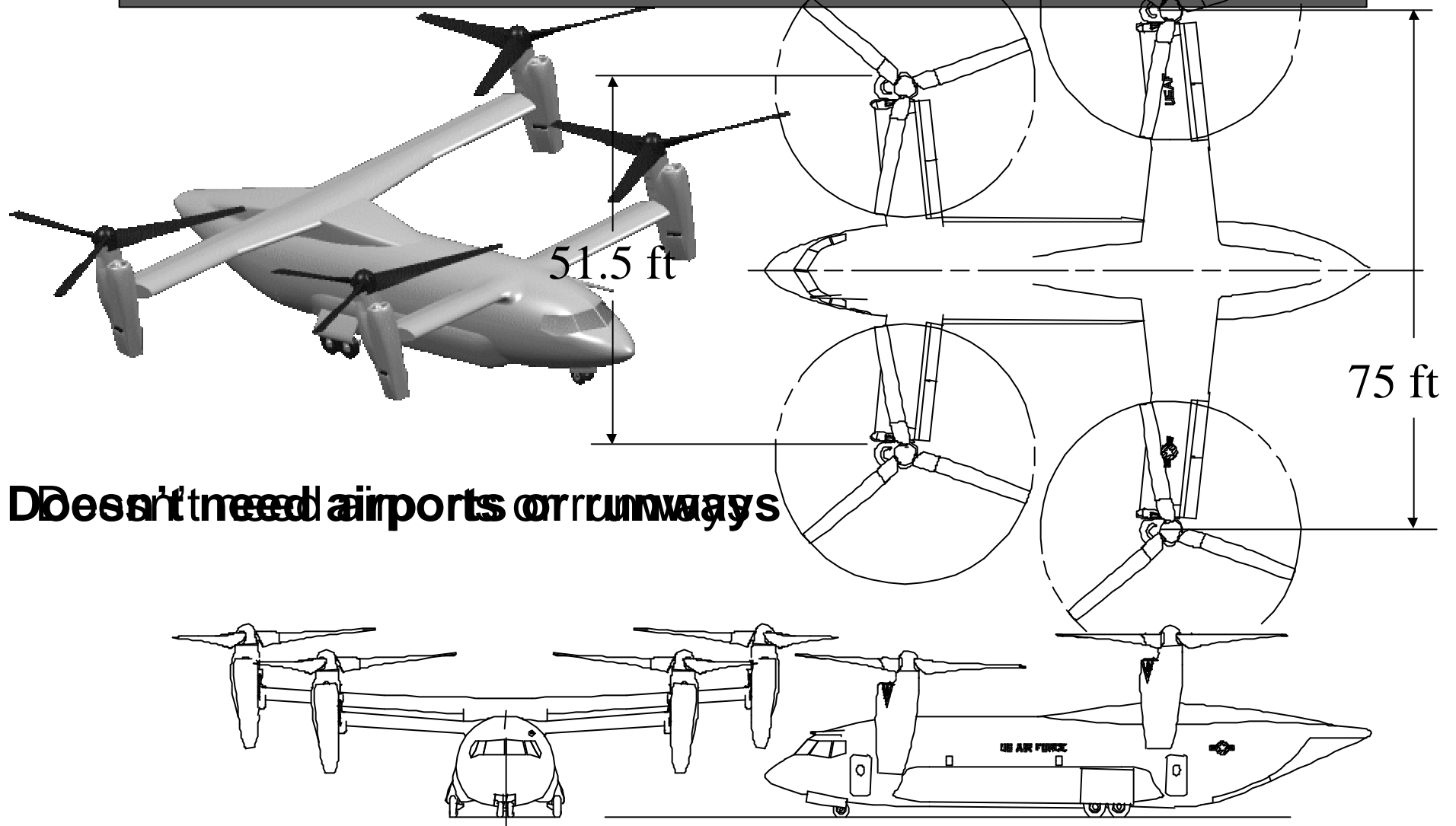
# ***QTR: Big brother to the V-22***



- Twice the lift capacity of V-22
- Six times the internal cabin volume
- Common lift/propulsion systems
- Common support system
- Common training
- Common parts

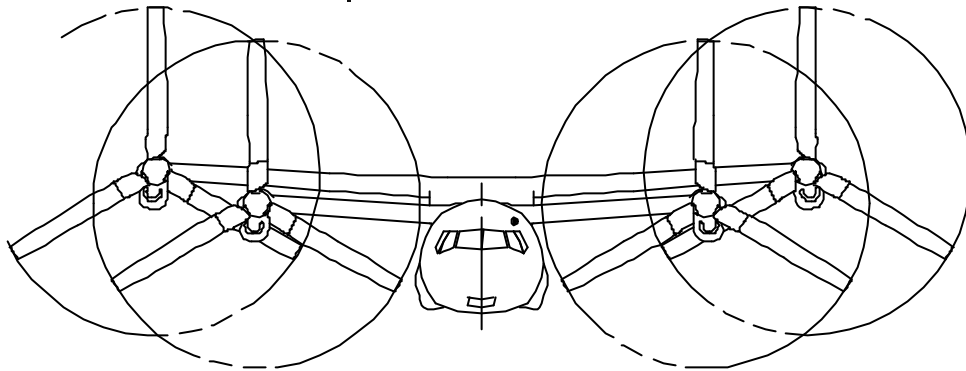
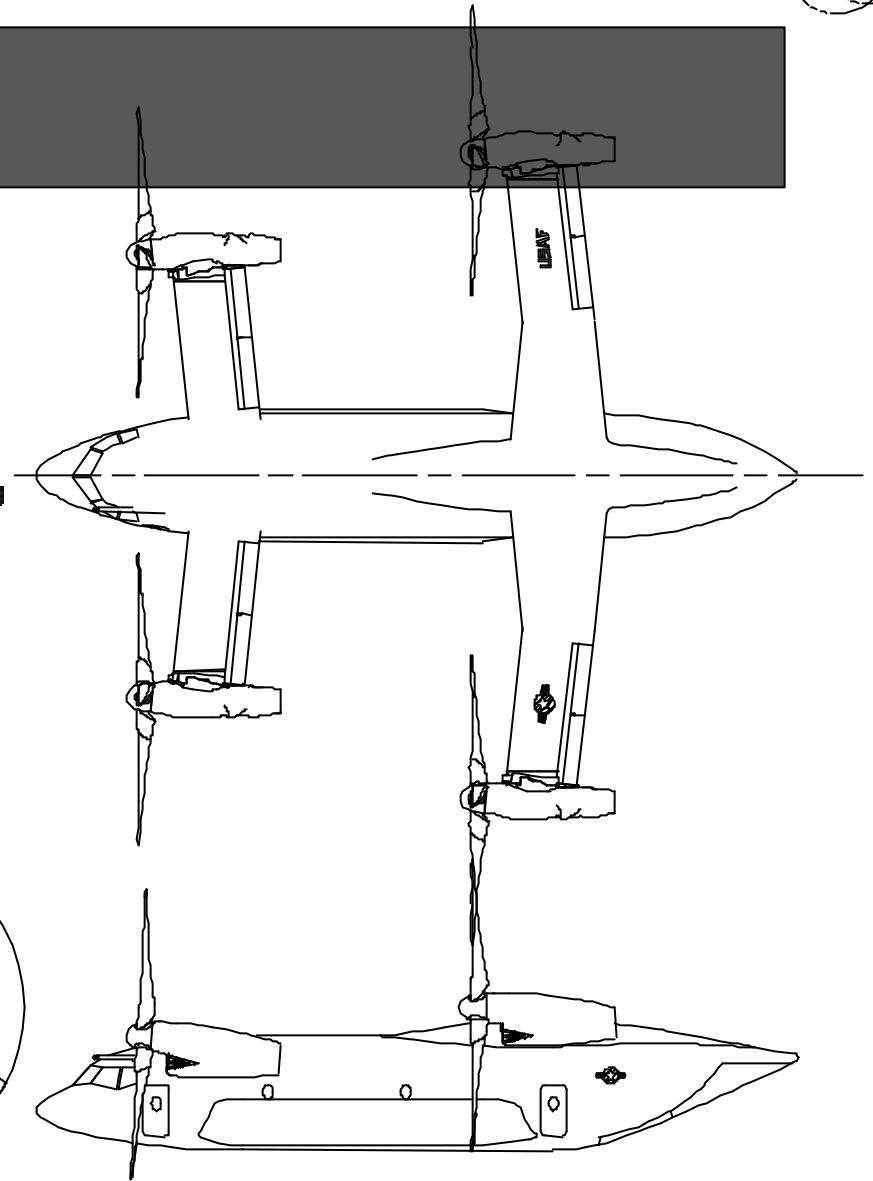
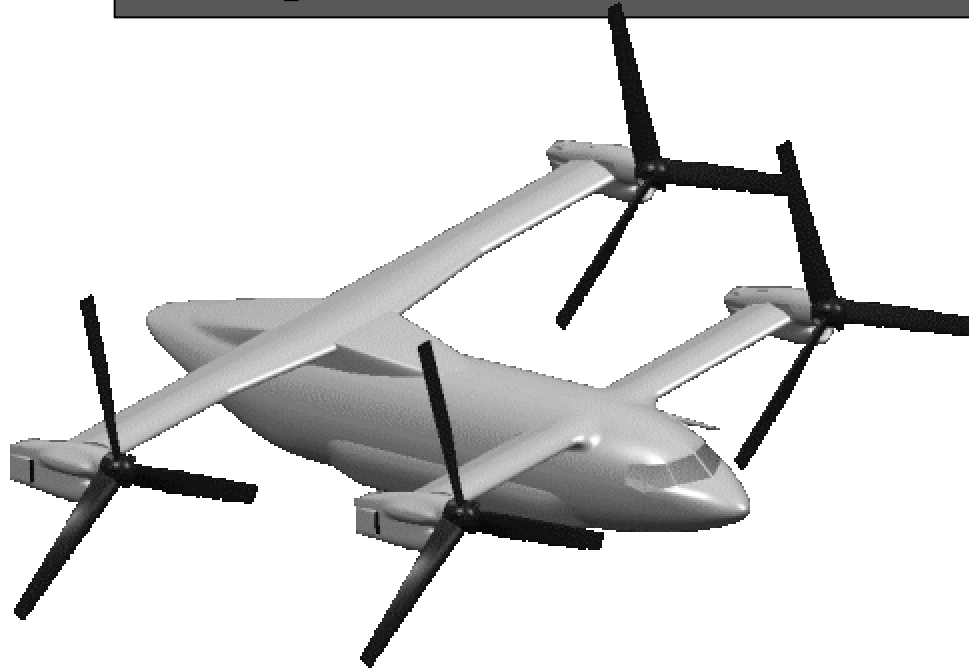


# *Three-view, helicopter mode*



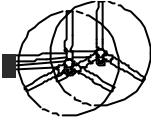
**Doesn't need airports or runways**

# Airplane Mode

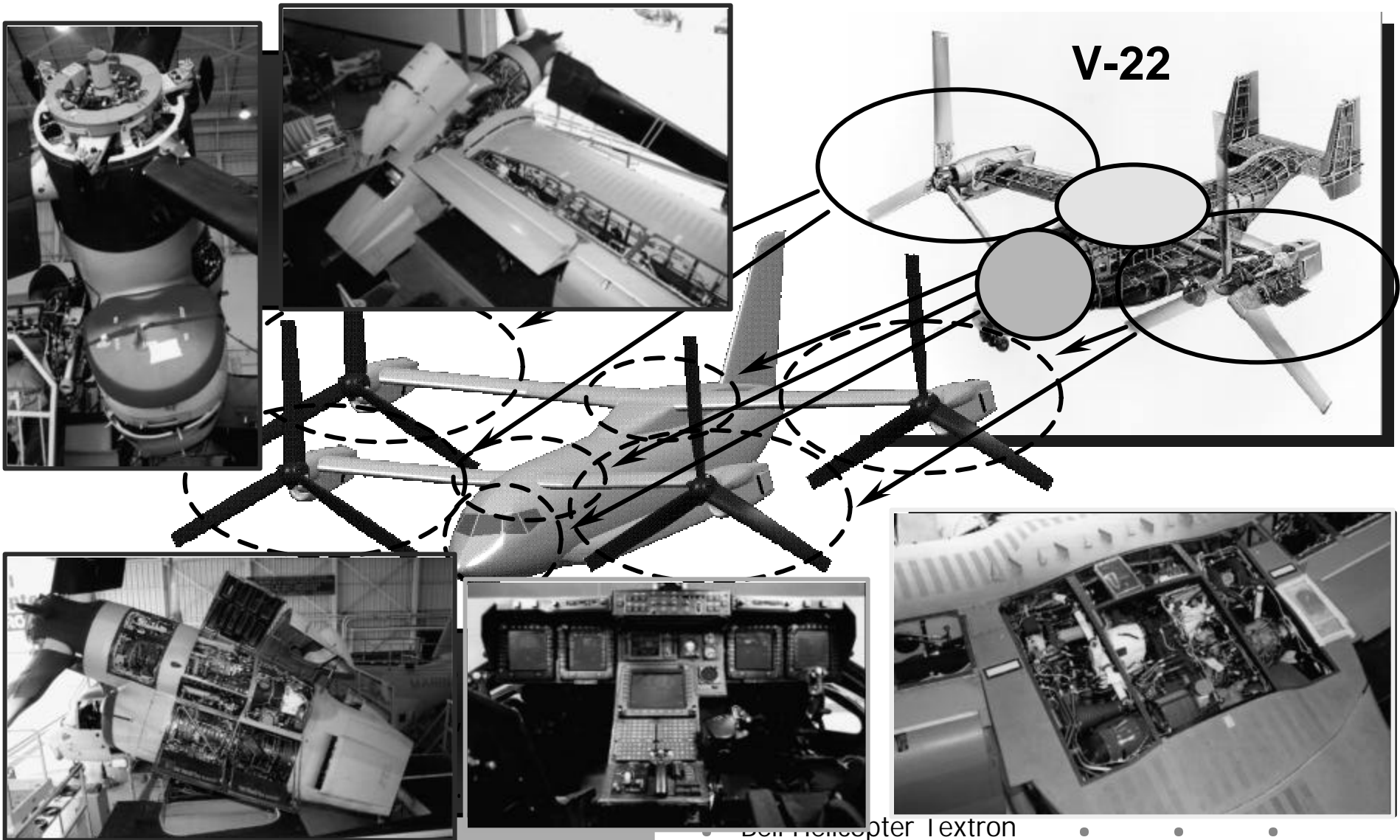


**Self-deployable around the world**

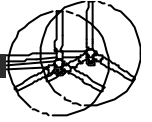
• Bell Helicopter Textron • • •



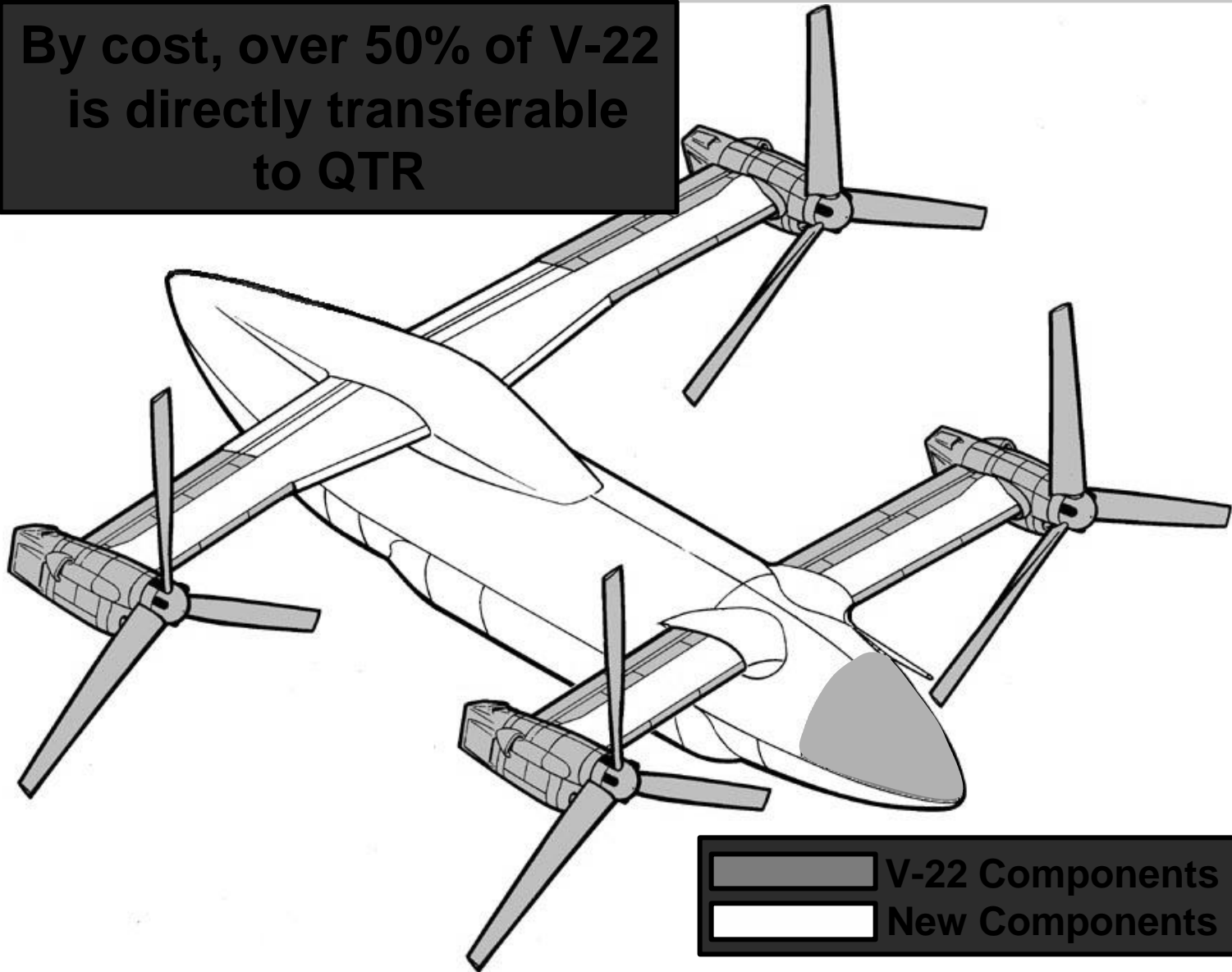
# *High V-22 Commonality*



# ***QTR/V-22 Commonality***

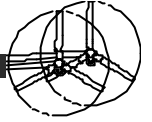


**By cost, over 50% of V-22  
is directly transferable  
to QTR**

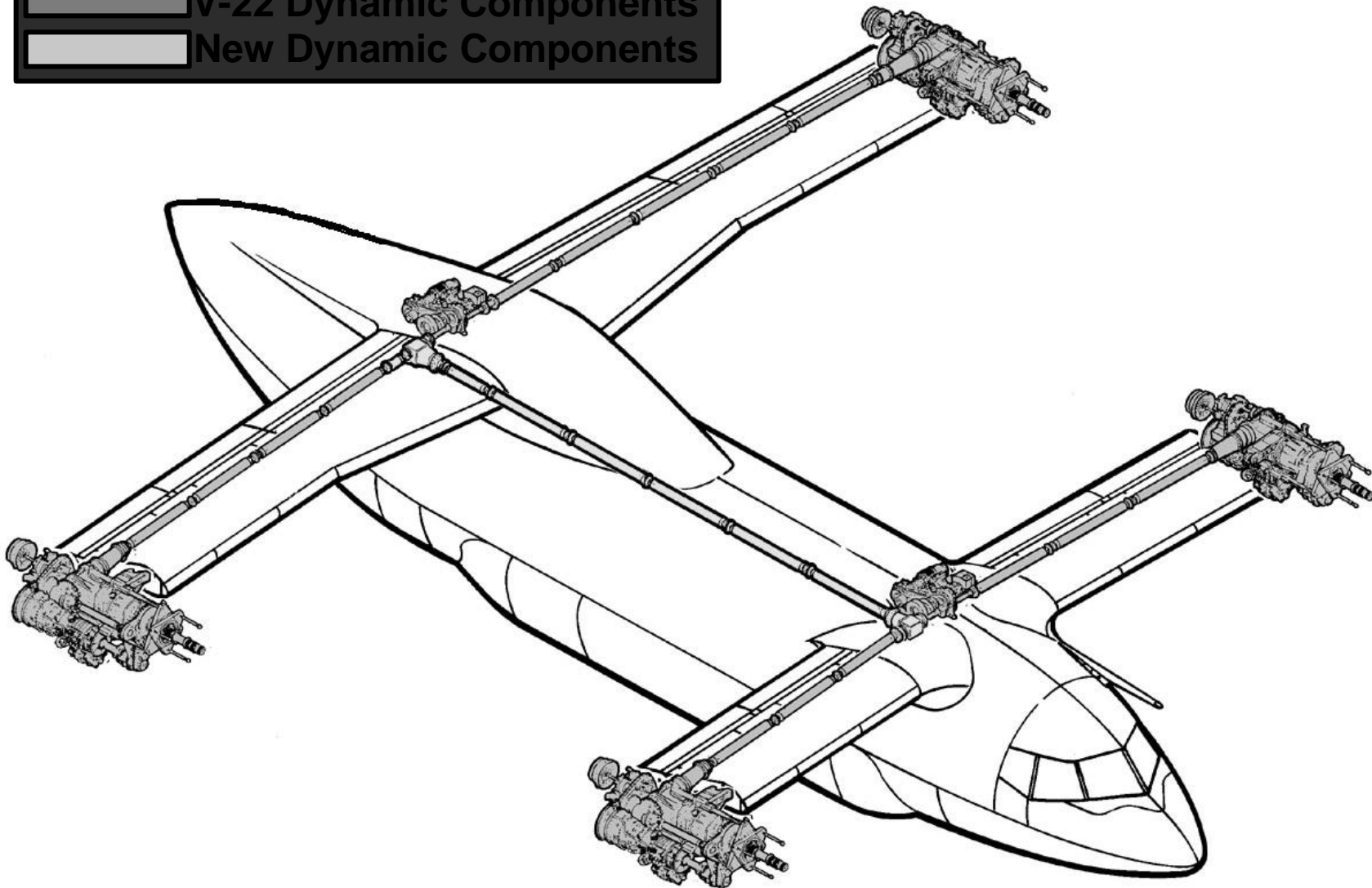




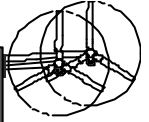
# ***QTR Common Dynamics***



 V-22 Dynamic Components  
 New Dynamic Components



# ***QTR Survivability Characteristics***



## **Nuclear/NBC Protection:**

- Pressurized Fuselage
- NBC Filtered Air
- NBC Ensemble Compatible
- On-Board Oxygen
- Filtered Avionics Cooling
- NBC Resistant Materials
- Nuclear Hardening
  - Blast and Overpressure
  - Thermal
  - Combined Effects
  - Radiation Hardened

## **Ballistic Tolerance:**

- Advanced Composite Construction
- Fuel System Fire Protection
- Four Engines, Redundant Drive Systems
- Redundant Fly-by-Wire Controls
- Redundant Electrical Power Systems
- Redundant Hydraulic Systems
- Swashplate Actuator Armor
- Crewstation Armor



## **Directed Energy Protection:**

- Low Power Laser
- Medium Power Laser
- High Power Microwave
  - Nuclear EMP

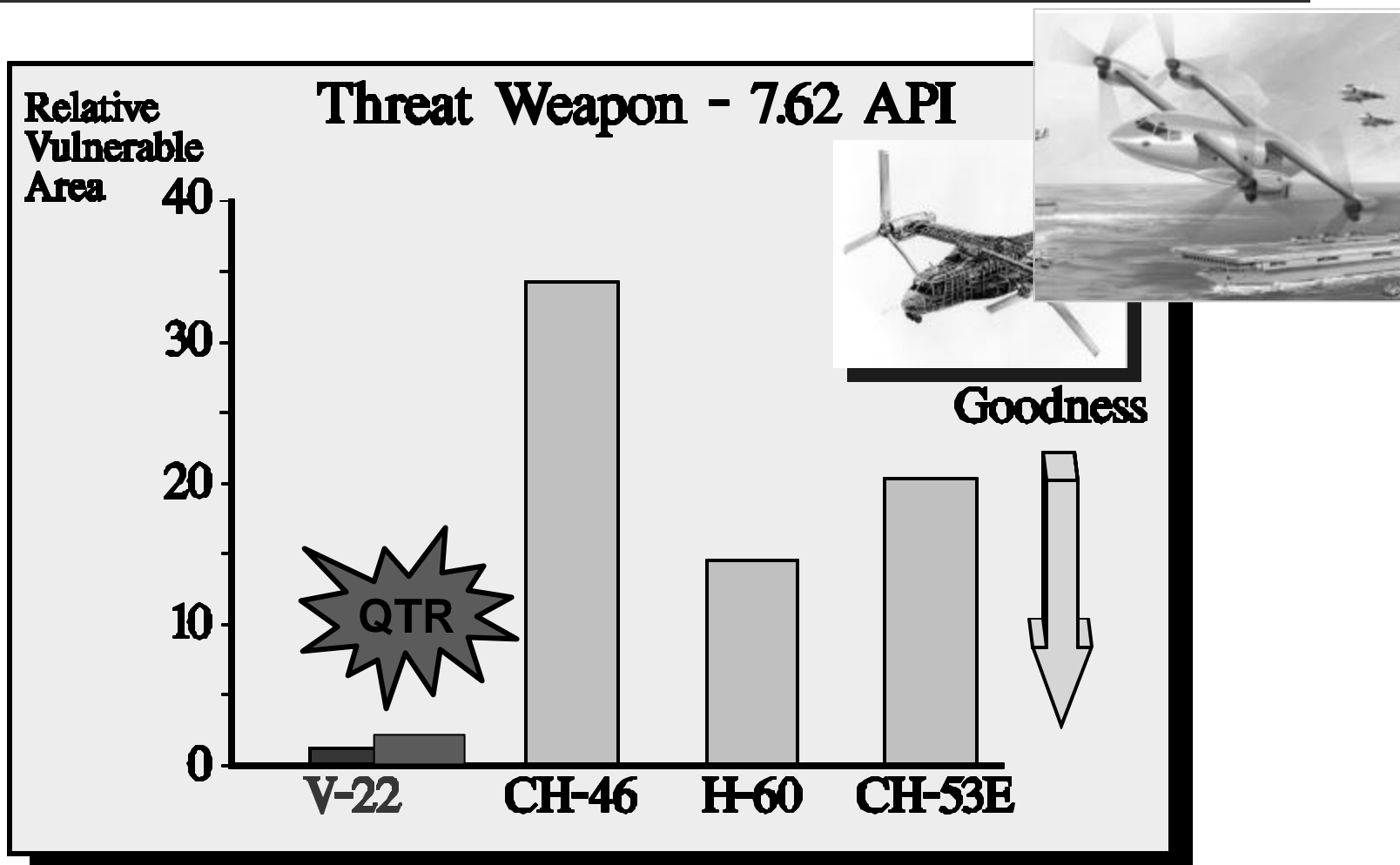
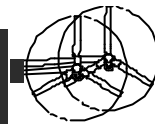
## **Low Signatures:**

- Infrared Suppressors
  - Low Cruise Power
  - Low Reflective Paint
  - Low Visual Cues
- Low Tiltrotor Acoustics

## **All V-22 Electronic Warfare Options**

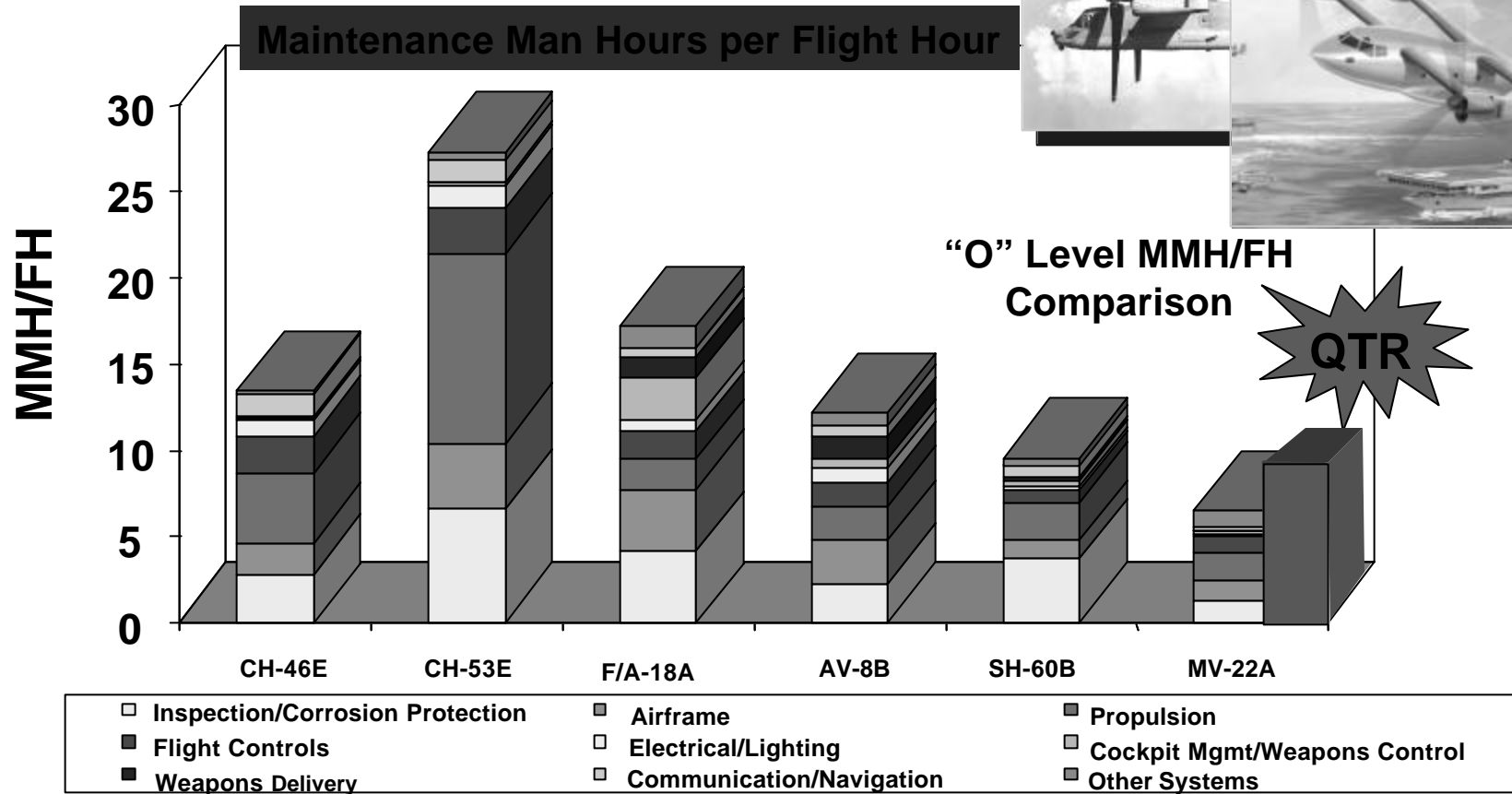
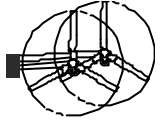
- AN/ALQ-211 Suite of Integrated RF Countermeasures
- AN/APR-39A (V)2 Radar Warning Receiver
- AN/ALE-47 Countermeasures Dispenser System
- AN/ARR-47 or -54 Missile Warning Sets
- AN/AAQ-24 DIRCM Directed IR Countermeasures
- AN/AVR-2A Laser Warning

# V-22 Vulnerability Comparison



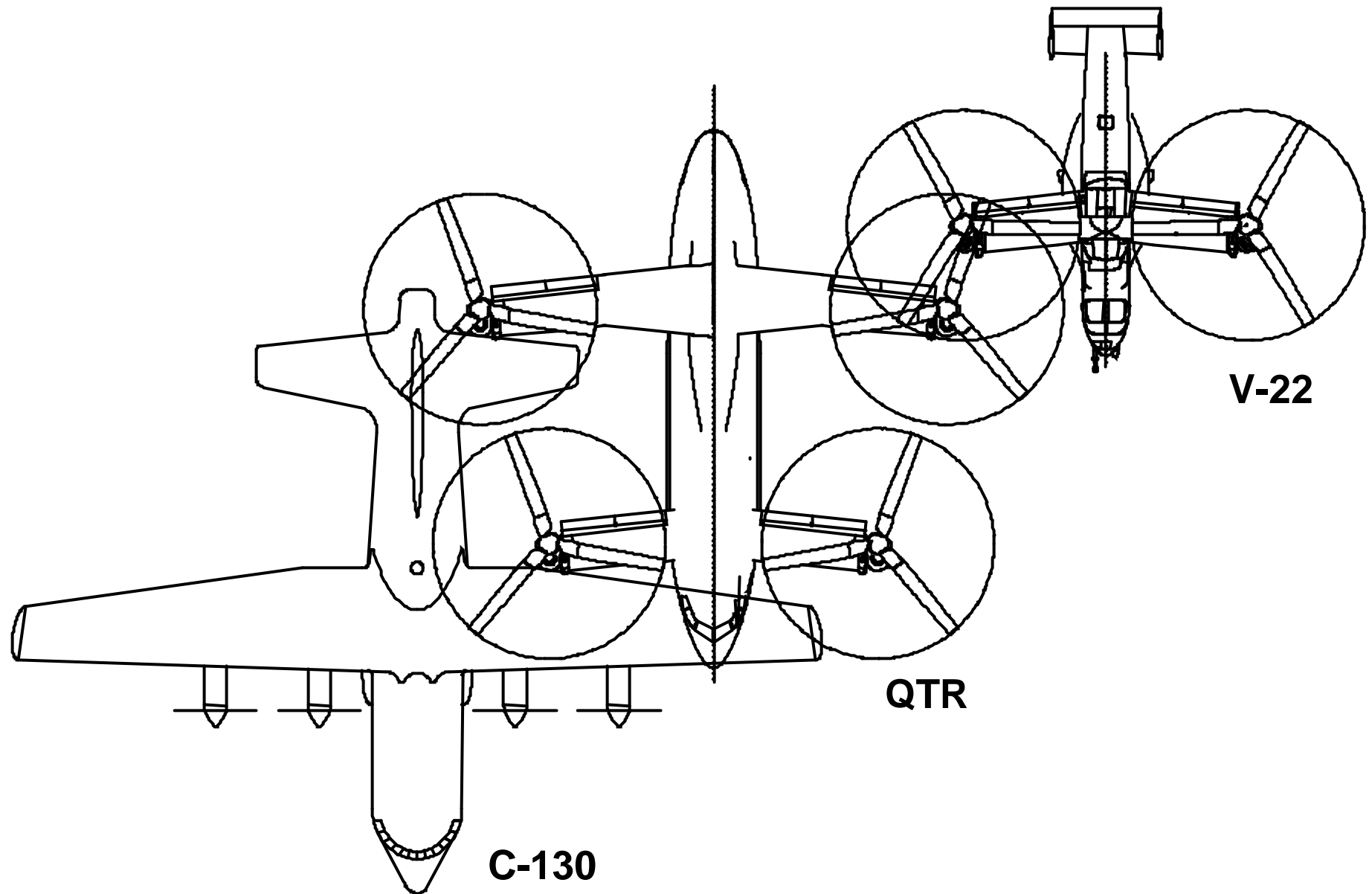
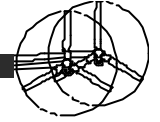
Naval Weapon Center Data - China Lake, Ca.

# Low Maintenance V-22... ... and QTR

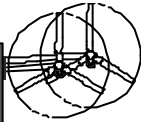


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# Size Comparison

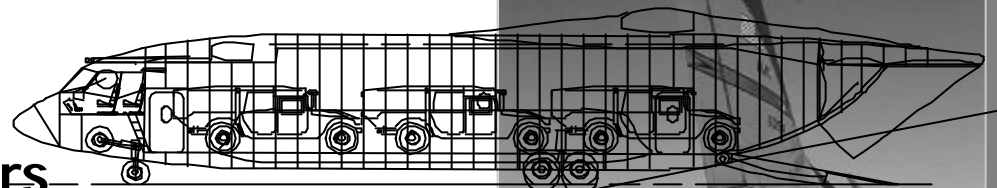
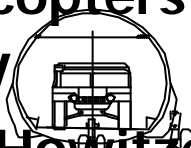
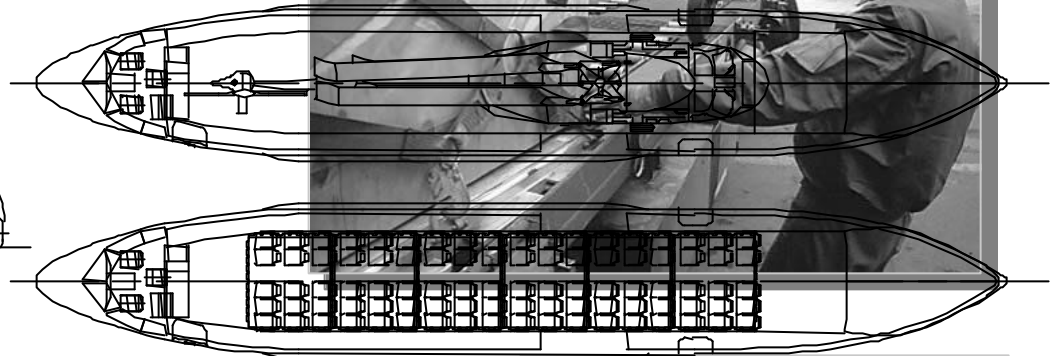


# *Fuselage Sized for Maximum Utility*

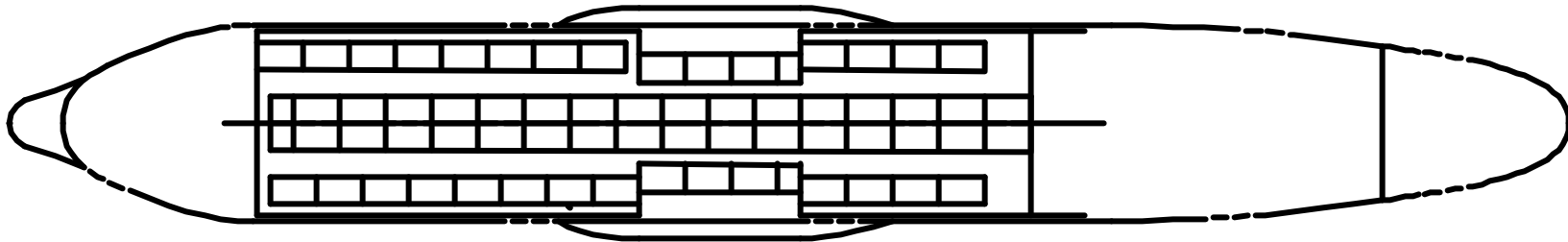
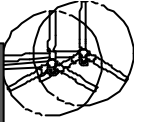


## ***Air-to-air Refueling probe, Rear Ramp, Straight-in loading***

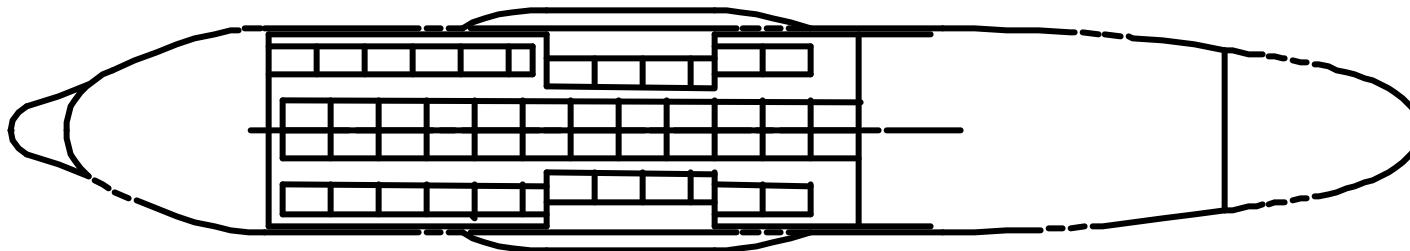
- ▣ Stretched C-130-30 size cargo bay
- ▣ Common load handling equipment
- ▣ 90 Para/122 pass/70 litters
- ▣ 15 tons of giveaway fuel
- ▣ Eight, 463L pallets
- ▣ Two, 8x8x20 ISO containers
- ▣ One, 8x8x40 ISO container
- ▣ All HMMWV variants
- ▣ Utility and attack helicopters
- ▣ A 7-Ton truck one LAV
- ▣ Two 155 Lightweight Howitzers
- ▣ MK48 Front Power Unit
- ▣ MK48 RPU & ISO/ANSI transporter
- ▣ HEMTT Transporter
- ▣ Complete command & control or gunship packages



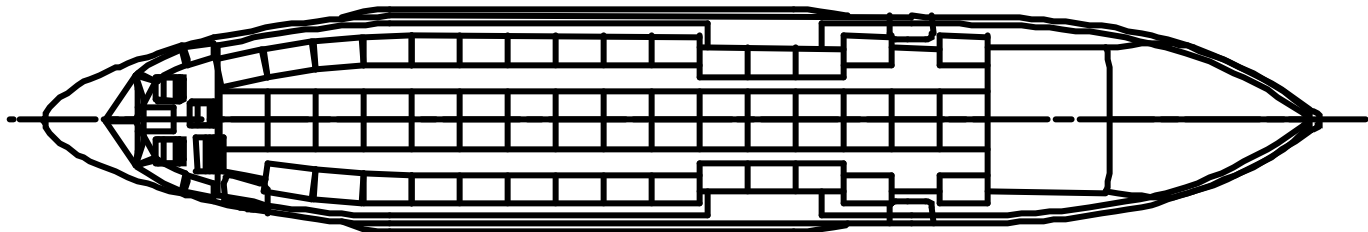
# Seating Comparison



C-130J-30 - 128 Troop Seats

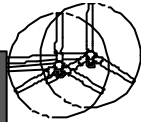


C-130J - 92 Troop Seats

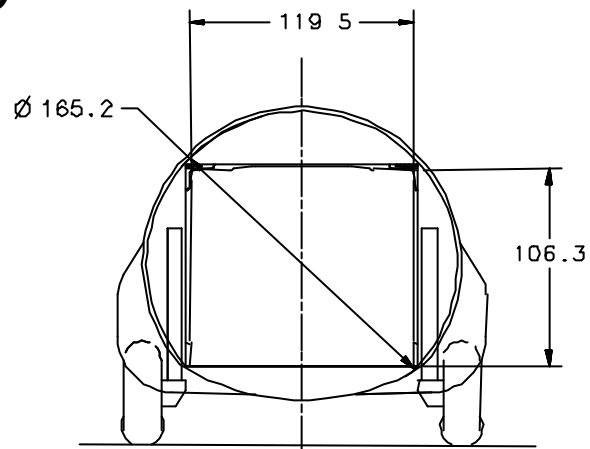


QTR - 122 Troop Seats

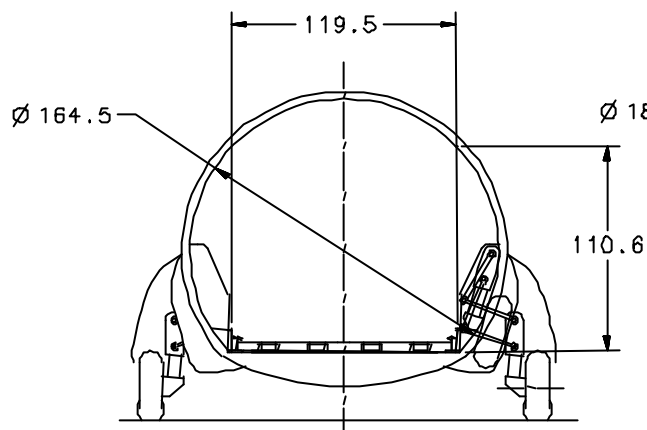
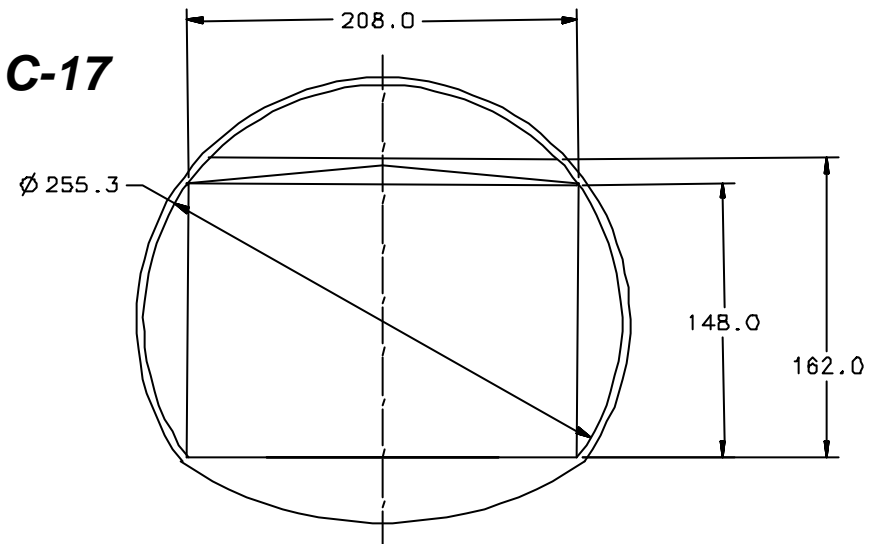
# Fuselage Cross-section Comparison



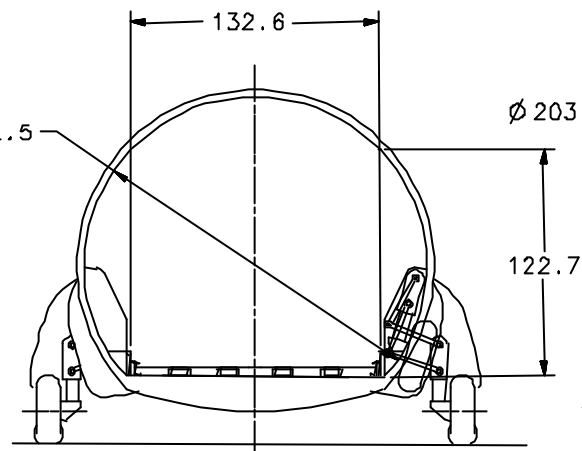
**C-130**



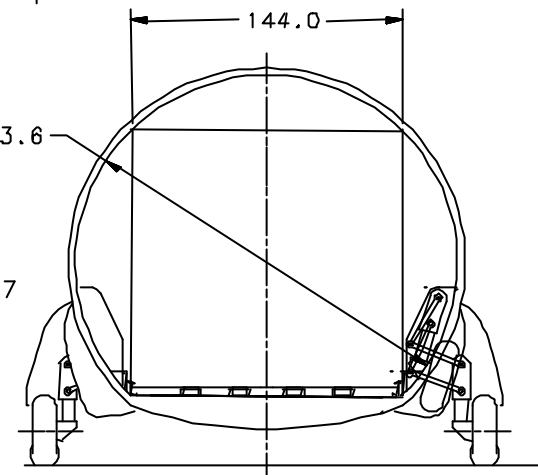
**C-17**



**QTR-C130**



**+18" diameter**

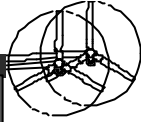


**JTR 12 x 12 Cabin**

• Bell Helicopter Textron • • •



# *Long Range V/STOL Resupply*



## Delivers:

- Up to 40,000 pounds  
1000 km and return.\*

## Or:

- Up to 25,000 pounds  
1000 km and return.\*\*

## Or:

- Up to 15,000 pounds  
1000 km and return.\*\*\*

\* STOL at mid-mission

4000', 95 deg. F.

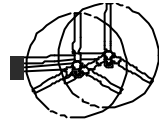
\*\* Hover IGE at mid-mission

Sea Level, Hot Day

\*\*\* Hover IGE at mid-mission

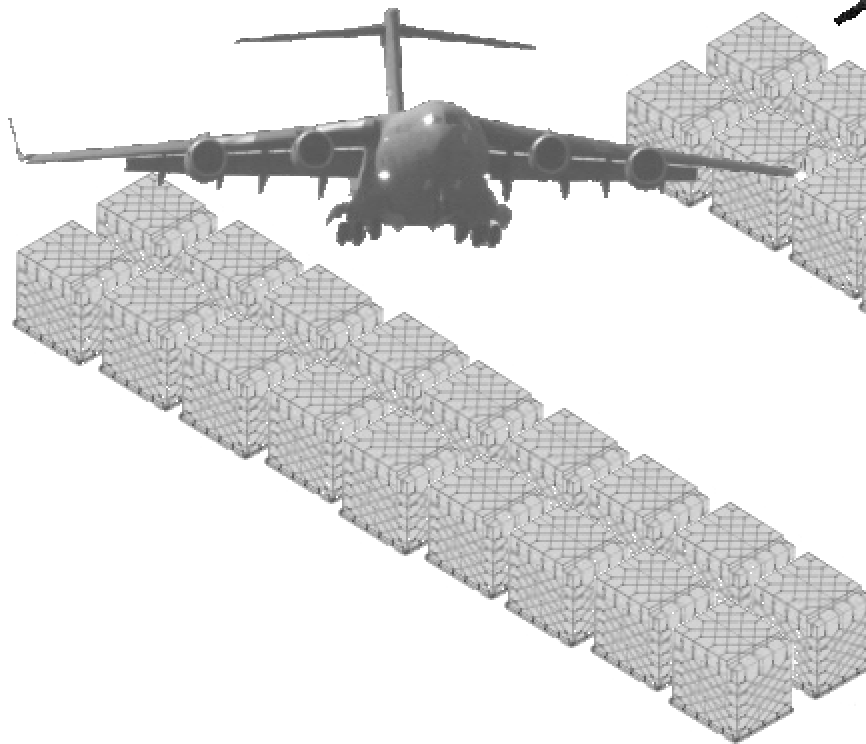
4000', 95 deg. F.





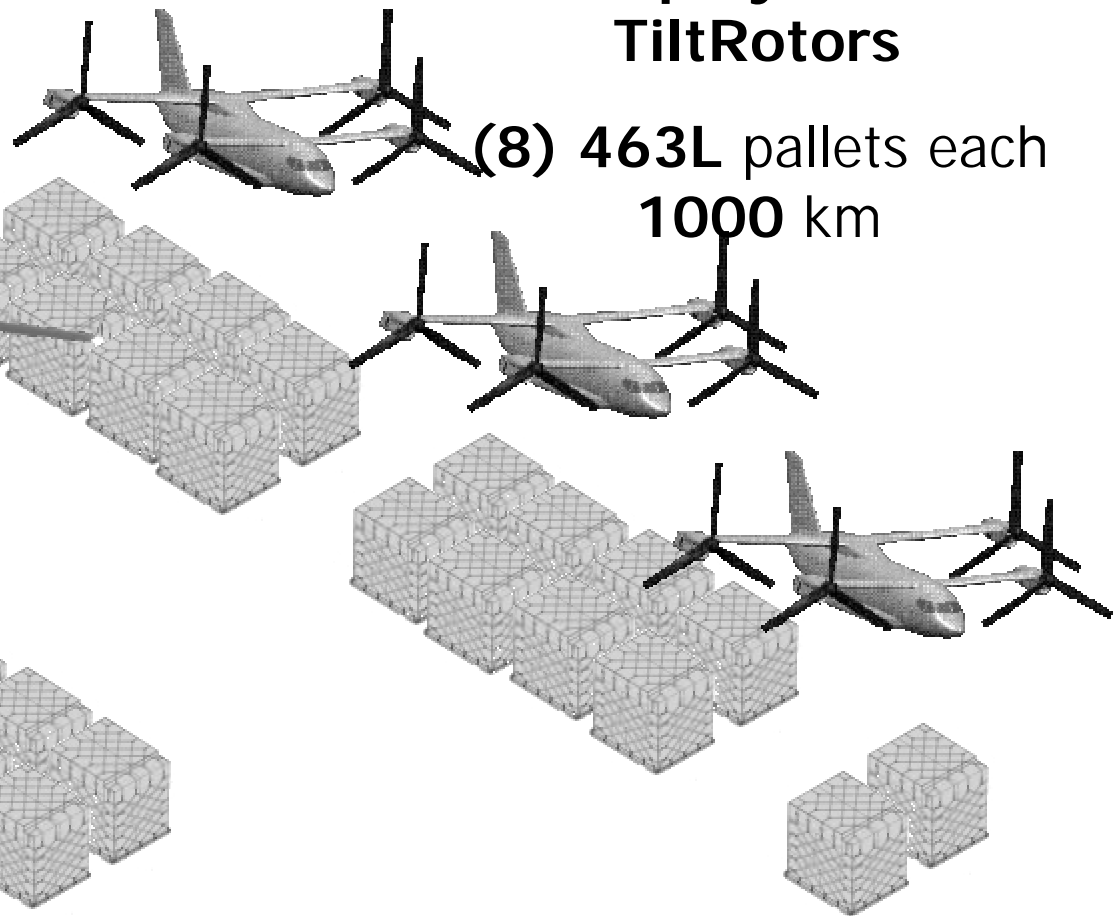
# *Common, Retail Cargo Handling*

C-17 Strategic Deployment  
(18) 463L Pallets

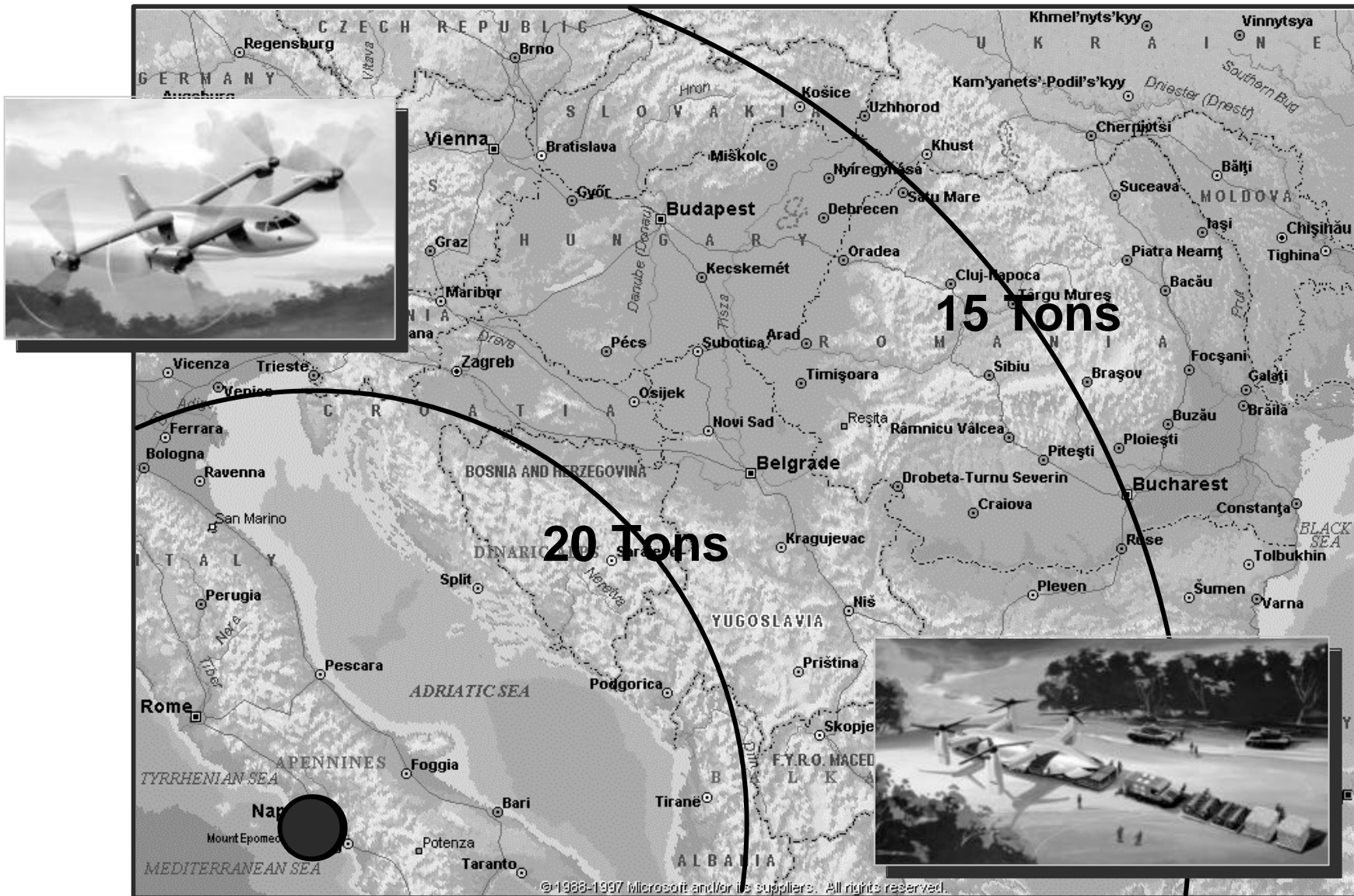
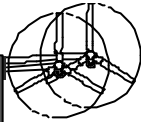


3 Tactical  
Deployment  
TiltRotors

(8) 463L pallets each  
1000 km

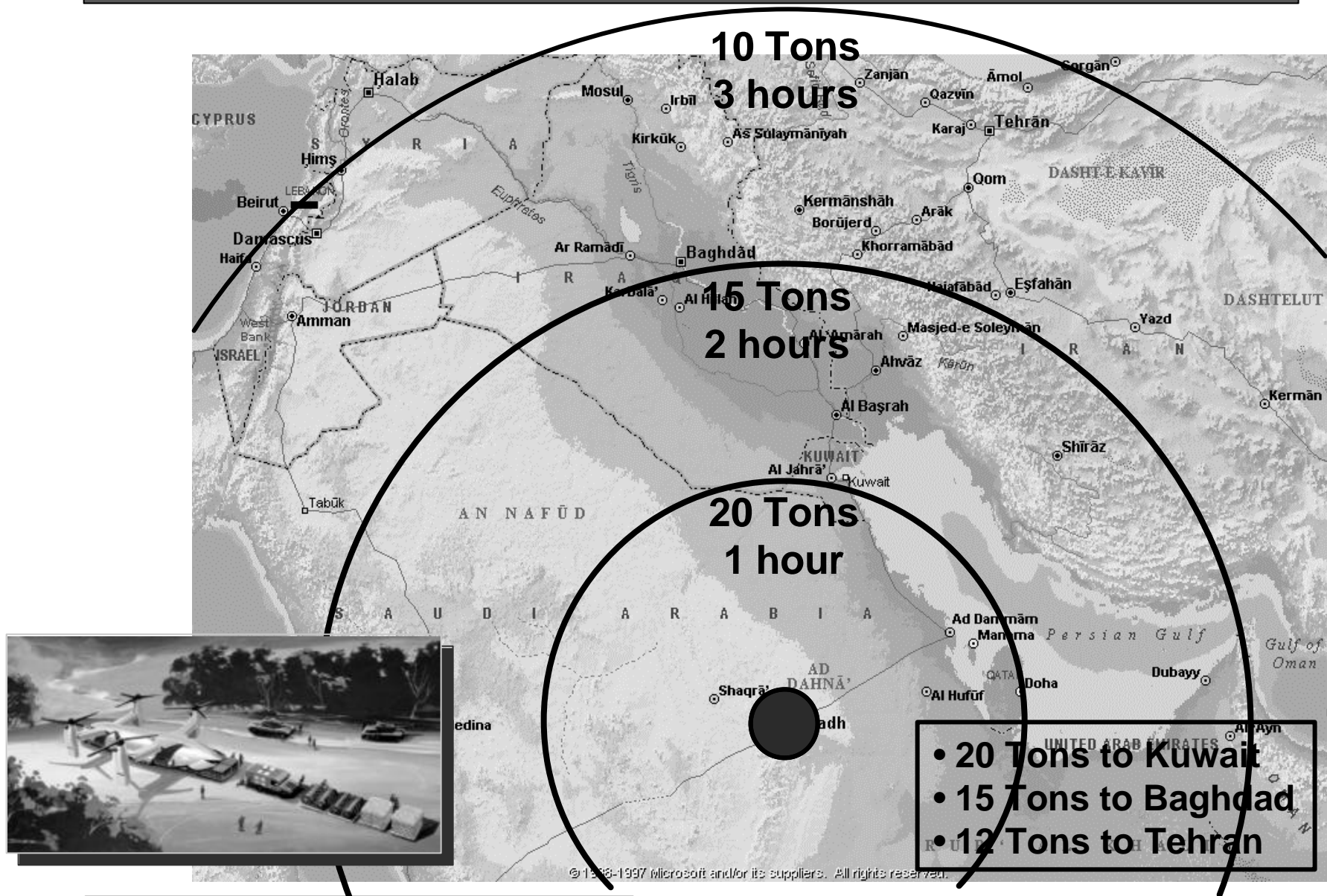
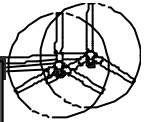


# Retail Delivery to the Balkans

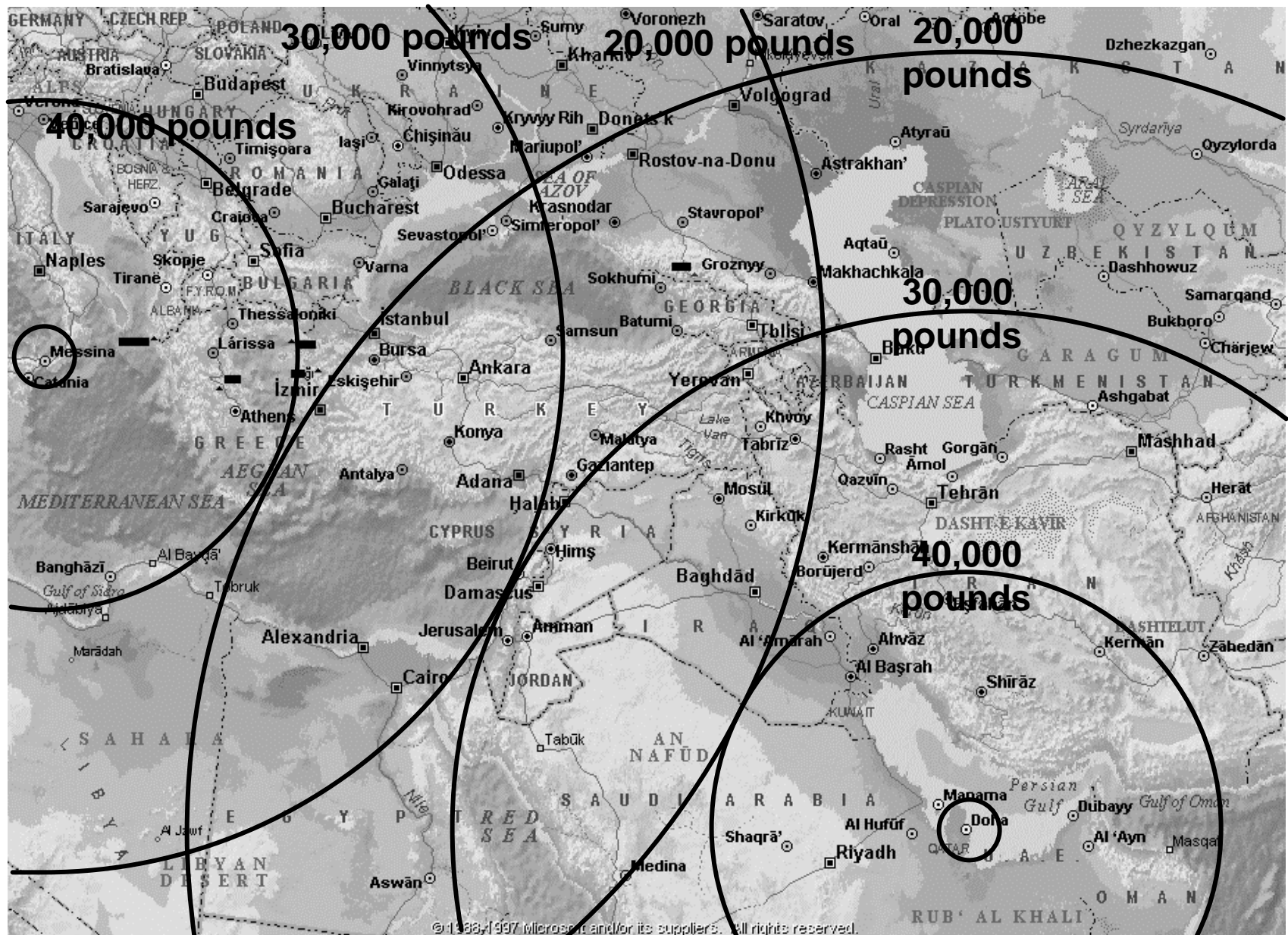
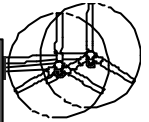


• Bell Helicopter Textron • • •

# QTR retail delivery in SW Asia



# Resupply of Forces from Egypt to Georgia







• • •